BRAZIL

FOWLS, BIRDS AND FEATHERS

FINE FEATHER BIRDS

Brazil undoubtedly occupies a first rank place in the parade of birds of showy plumage.

In accordance with the studies of the most prominent Naturalists, at least 1,680 species of birds are know in Brazil, a number far superior to any other presented by other countries in the world.

Tho, in the great variety, some of the species show characteristics that are not exclusively Brazilian, nevertheless, the largest number is comprised by species of genuine Brazilian markings and so impressing and peculiar as to place the Country's avi-fauna in a most splendid position.

The Brazilian birds with the effulgence of their singular plumage, have afforded the most interesting motives of ornamental art to mankind. By taking into consideration the three special types of feathers, i e., the so-called or big feathers, the tectrices or coverts, and the downs, we find that Brazilian birds present all these types with singular, handsome and lively aspects, which justify their steady and ever growing demand, especially for decoration and fashion. Here we shall refer only to some of the most prized birds, in accordance with the coloring of their feathers:

JACAMIN — a big bird of the genus Psophilidae (Psophia crepitans), having a metal black color and a graceful appearance. He is the South American representative of the European crane;

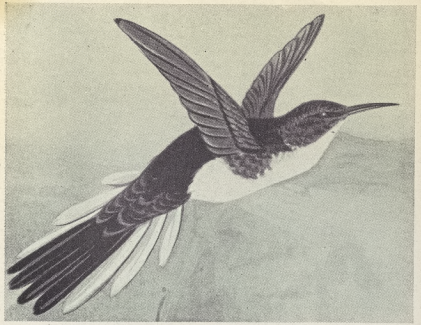
GUARÁ — the Tantalus ruber or Endocimus ruber of the family Ibididae, with a fine scarlet-red plumage;

MAUNAS — remarkable for the ermin necklace they have, especially the TACHAN of the genera Palmiped (Mauna cristata);

SURUCUÁS — covered with the most beautiful silky feathers;

HUMMING-BIRDS — constituting the family of Trochilidae, of tenuirostral birds, including the smallest and most brilhant of the whole feathered race ; — real precious winged gems of colored feathers with metallic fulgor, and of which there are in Brazil eighty charming varieties;

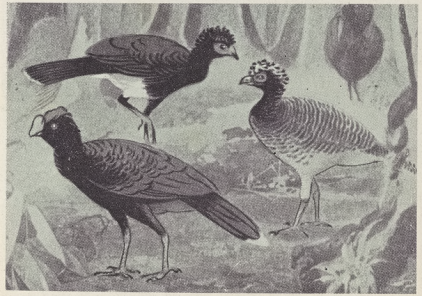
SPOONBILLS — a especies known by the Indians as "Ayaya"; they are related to the ibises and belong to the genera Platalea or Ajaja, and have a spoon-like bill; their plumage is very beautiful, of a pinkish white color with crimson trimmings on the wings and coverts; the hooked bill climbing birds — parrots — of the family Psittacidae, with numerous species, remarkable for their beautiful colors, and among which we find the ARARA-AZUL (Blue arara)



HUMMING-BIRD (eliothrix aurita)

TOUCANS (Rhampastus discolorus)

A ROYAL HAWè (Thrasaëtus harpia)

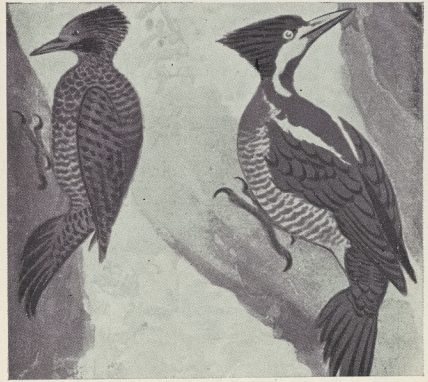


MUTUM Pinima (Crax pinima) MUTUM (Mitua mitu)

A RING-PARROT (Deroptyus accipitrium)

EMAS (Rhea macrorhyncha)

A TROCHAL DOVE (Columba speciosa)



WOODPECKER (Celeus undatus)
WOODPECKER (Coeophlocus lineatus)

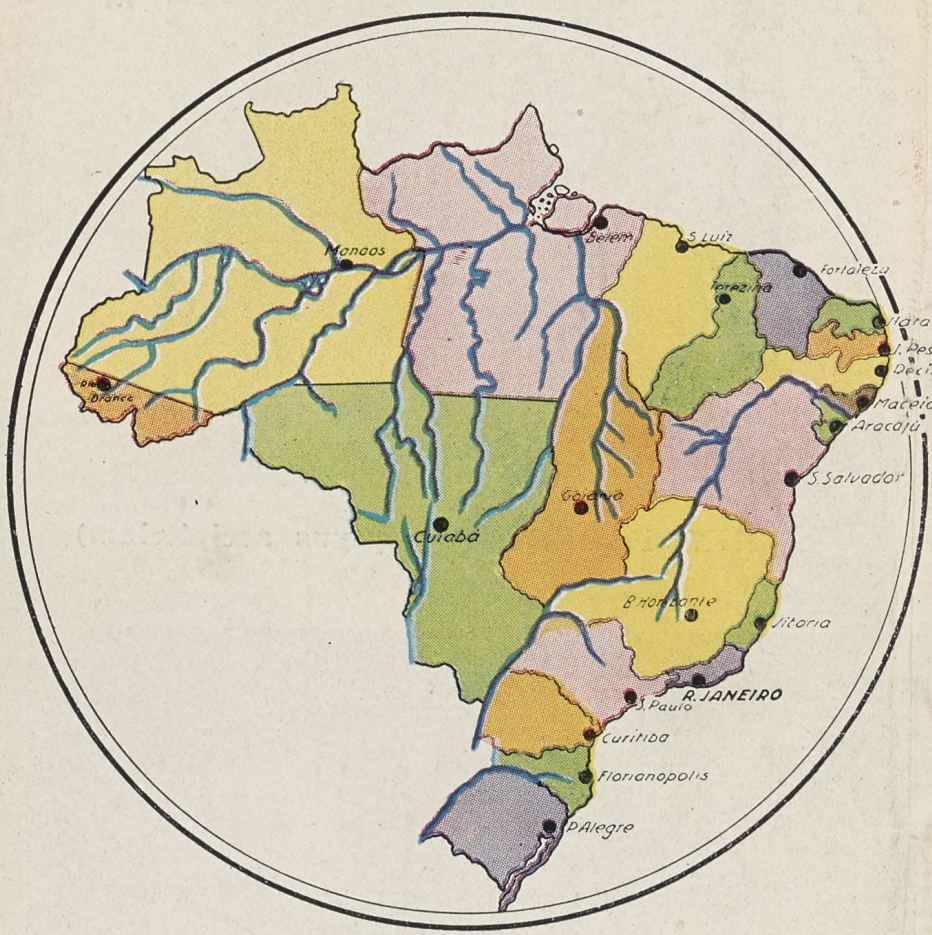
(Ara araruana), the ARARA-PIRANGA (Ara macáo) and the CALONITA (Miopsita monachus); the climbing birds of the genera Conuros as the JANDAIA (Conuros jendaya) and the PARRAKEETS (Brotogeris tirica); the climbing birds of straight bills, including the various species of the genus Picus (Lin), as the white WOODPECKER (Leuconenpses candidus), the yellow head WOODPECKER (Celans flavescens) and the red WOODPECKER, known in the Amazon under the name of ARAPUASSÚ, all presenting brilliant plumage.

Of all families, genera and species of birds existing in the world, Brazil counts corresponding similar variety of a genuine Brazilian characteristic, such as: Rapaceous — URUBÚ-REI (vulture) (Cathartes papa); Falco — EAGLE (Falco halioetus), CANCAN (Hycter americatus), CARÁ-CARÁ (Milvago chimango) and others; Strigideous — CABURÉ (Glaucidium brasilianum); in the Columba (Lin) genus — JURITY (Leptotila rufaxilla); in the order of Dentirostral — ARAPONGA (Chasmorhychus nudicolis), SAHÍ (Ateleodacius speciosa), YAPÚ (Ostinops decumanus) and others; Subulirostral birds — SAPUJABA (Oriolus brasiliensis); Conirostral — CARDINAL (Loxia cardinalis); Magnirostral — HUMMING-BIRD (Jacamaralcyon tridactyla); Tenuirostral — AZULÃO (Stephanophorus leucocephalus), MARTIN-KINGFISHER (Ceryle amazona) and others; Fissisrostral — SAHIRA (Calospiza preciosa), GATURAMO (Euphona aurea) and others; in the order of Gallinaceous — ARACUAN (Eutalis katraca), JACÚ (Penelope cristata) and MUTUM (Crax pinima); "Crypturas" — CARQUEJA (Fulica armillata, WATER-HEN (Creciscus ex-elis) and the SARACURA (Aramides saracura); among the straight bill climbing birds, we have a numberless variety of Woodpeckers, and among the hooked bills, a countless number of Araras, Parrots, Parrakeets, etc. In the class of the Rhampatidae, we find the TOUCAN (Rhampastos discolorus), the EMU (Rhea americana) and the long legged SERIEMA (Microdactylus cristatus), PARÁ PEACOCK (Eurypyga helias) and others; among the river bank birds, we count the AIGRET (Pilherodius pilearus), the JABURÚ (Siconea mycteria), the TUYUYU (Tantalus americanus), the water-hen QUERO-QUERO (Belonopterus cayannensis) and the JACANÁ (Parra jacana). In the order of the Palmipeds, genus Anser, we have the MARRECA (Dendrosygna fulva), WILD-DUCK (Cairina moschata), the Pellecanus — MERGULHÃO (Lula leucogastra) and the Procellaria — GAIVOTA (gull) (Lauru maculipennis).

Goeldi, Ihering, etc., have most encomastically referred to Goeldi, Ihering, etc., have most encomistically referred to the Brazilian avi-fauna, not only concerning its grand variety, but also with regard to the brilliancy of its aspects.

Comp. Carioca de Artes Graphicas
RIO DE JANEIRO — BRAZIL

NEW YORK WORLD'S FAIR 1939



SEYMOUR DURST

OFFICIAL PUBLICATION

BRAZIL

FIBERS

FIBERS

FOREWORD — The Brazilian flora is quite opulent in plants yielding textile fibers.

Some of these plants are cultivated; others are spontaneous. Some are industrialized, while others are awaiting the discovery of new economical processes of industrialization.

The palms, the malvaceous, the bromeliaceous, the amaryllidaceous, the tiliaceous and the sterculiaceous vegetating in Brazil supply first class material for the textile and paper industries.

Brazil will, therefore, be in position to get rid of the burden of importing foreign jute and hemp, as soon as she is able to improve her extractive industry of textile fibers, and to undertake the rational cultivation of the plants in a volume capable of producing raw material sufficient to meet domestic and even foreign requirements.

PIASSAVA

The fiber called "piassava" is obtained from the leafstalks of the "piassabeira", a palm whose scientific classification is **Attalea funifera** Mart.

This palm grows spontaneously along the littoral in the state of Baía. Its fronds are straight and long, reaching 12 meters in length. When the palm is ten years old, it begins to bloom and bear fruit, in clusters containing 300 or more nuts.

At the age of four years, the palm starts to furnish its fiber; however, it is only in its eighth year that crops of real economical value can be obtained.

The fiber of the piassava palm is generally used in the manufacture of brooms, door mats, brushes and scrubbers. It is also used for marine cordage as it advantageously withstands the action of salt water.

The fibers are classified in two types, namely: "Primeira" (first) when long, strong, flexible and obtained from full grown leafstalks; "Segunda" (second) when short, slim and of an inferior grade. Each "piassabeira" can yield 8 to 10 kilos of fiber.

The palm tree commonly called in Brazil "piassabeira", which is found in the state of Amazonas, and whose vegetation is almost entirely confined to the region of "Rio Negro" is the scientific **Leopoldinia piassaba,** while that growing in the state of Baía is the **Attalea funifera** Mart.

The fiber from Baía is harder and stronger and therefore better reputed.

In the state of Maranhão large tracts of land are to be found covered with piassava palm trees, specially throughout the zone washed by the "Tocantins" river.

Neither in the state of Amazonas nor in Baía have they ever thought of gathering the piassava nuts and use their kernels. In Maranhão, however, they are used to some profit.

The mesocarp of the nut of the **Leopoldinia piassaba** growing along the "Rio Negro" has the same food value of the Babassú nut and the natives use same in making flour for porridge, etc.

LEADING EXPORTERS OF PIASSAVA :

The principal firms dealing in the export of this fiber are established in **Manáus,** Amazonas; **S. Salvador,** in the state of Baía, and in **Rio de Janeiro,** Federal District.

FIBERS OF "MALVA ROXA" (PURPLE MALLOW). "CURAUÁ" AND "MALVA VELLUDO" (VELVET MALLOW).

BRAZILIAN PRODUCTION OF PIASSAVA FIBER :

YEARS	TONS
1933	5.420
1934	5.593
1935	5.512
1936	6.108
1937	6.704

TOTAL EXPORTS IN THE FOLLOWING YEARS :

YEARS	TONS	VALUE $ (PAPER)
1933	4.221	266.472
1934	4.651	368.767
1935	4.496	436.380
1936	4.796	654.011
1937	5.038	557.604

During the period of January to September 1938, Brazil exported 3.244 tons of piassava, valued at $383.838 (Paper).

UACIMA

Uacima or Uaicima is a generic name commonly applied in Brazil to the admixture of fibers extracted from several vegetable species distributed among three distinct botanical families such as the malvaceous, the sterculiaceous and the tiliaceous, and which, at present, are merely extractive.

Among the aforementioned plants, there outstands the Malva roxa — **Urena lobata** L. and the Malva velludo — **Pavonia malacophylla** —, both of the family Malvaceae, already industrialized in the state of Pará where same is employed as a substitute for indian jute.

Fibers extracted from these mallows are being used in the proportion of 100% by "Fabrica Perseverança" of Messrs. Martins Jorge & Co., of Belém, Pará, in the manufacture of burlap, and the best results are obtained.

"Fabrica Perseverança" is the leading concern engaged in the industrialization of textile fibers in the Amazon region, and works on cordage, ropes, twines, threads, cors, plain and tarred burlap, fishing lines, etc. At present that Company has an annual comsumption of about 600 tons of fibers native to the Amazon.

"Malva Roxa" (purple mallow) is known in the state of São Paulo under the name of "aramina", while in the Northeast they call it "carrapicho".

"Malva Velludo" (velvet mallow) produces a beautiful strong fiber and is taken from a shrub that attains more than two meters in height and withstands several prunings.

The experts of the Ministry of Agriculture have observed that the best season for pruning the "Malva roxa" and "Malva velludo" is that of their blooming, which happens five months after plantation. When pruned before that season, the fibers are silky but lacking in resistance, and if extracted during or after fruiting, they are ligneous and present heavy loss, 30, 40 and 50% according to the age. Under the circumstances, manufacturers are obliged to mix same with a corresponding proportion of indian jute so as to obtain the aimed results.

By solving the agronomical problem of the "Uacima", through experiments and extensive cultivation so that an ever increasing production is available, Brazil will drop the importation of indian jute, thereby retaining her gold reserve.

TUCUM

Among the fiber yielding palm trees growing in Brazil, more than one bear the common name of "Tucum". They belong to the genera **Bactris** and **Astrocaryum.**

The principal species of the **Bactris** genus is the **Bactris setosa** Mart, a low and thorny plant only three meters high, with spiny leaves two meters long. This species is very abundant from the midlands of the Northeast down to the states of Rio de Janeiro and São Paulo, and it is also to be found at various other regions in Brazil.

The outstanding species of the genus **Astrocaryum** is the **Astrocaryum vulgare** Mart, which hightens 10 and 15 meters and is scattered all throughout Brazil, yielding an excellent fiber from its leafstalks and an edible oil from its nut kernels.

The thread spun with the "Tucum" fiber is the best known for the weaving of fishing nets due to its unusual resistance, flexibility and duration.

"Tucum" surmounts by 200% the resistance of other fibers employed in the manufacture of fishing apparel.

The kernel gives an oil that rivals with olive oil, and the cakes are used for feeding poultry, cattle, etc. In the interior they use the dry shelled nuts to make bobbins employed in cushion lace making.

The fiber is also used in the manufacture of de luxe hammocks, ropes, dusters, mats, rugs and marine cordage. The palm gives a tasteful palmetto, and the green nuts kill the thirst of a great many travelers in the arid lands during the droughts.

CURAUÁ

"Curauá" is a plant of the family Bromeliaceae, whose scientific classification is **Bromelia sagenaria** A. da C. It exists in the state of Pará and in some other regions in the Brazilian territory. Two species are known: "Branco" (white) better, more resistant, lighter in color and, therefore, more valuable; "roxo" (purple) of an inferior grade. The plant is not so very particular as to soil and climate. It grows satisfactorily in silici-humous ground and even in soils slightly humous. Its reproduction is obtained by means of shoots.

The longest "curauá" fibers reach 2 meters and a bush of the plant yields an average of 350 grams of fiber.

The "curauá" resists the attacks of the black ants. The harvesting is done 12 to 14 months after the plantation, when the points of the leaves start to become yellowish.

This fiber is not in the commerce nor in the industry as yet.

PACO-PACO

A plant of the family Malvaceae, "Paco-Paco" is scientifically classified as **Pseudabutilon spicatum** H. B. K. It is also known by the common name of "Malva pendão" (banner mallow). It reaches one to one and half meters in height and furnishes a first class fiber greatly sought after as it supersedes jute. It grows spontaneously in North Brazil, specially in Pará and Ceará.

Same as "curauá", "paco-paco" is not commercially exploited as yet.

PAPOULA DE S. FRANCISCO (S. Francisco Poppy)

This species of wild poppy is commonly known as "Canhamo brasiliensis", and is scientifically classified as : **Hibiscus ferox, Hibiscus radiatus** Cav. and **Hibiscus unidens** Lind. All these classifications, however, are synonymous to **Hibiscus canabinus,** L.

It grows in Brazil as a sub-spontaneous species, along the valleys of the "S. Francisco" river and its tributaries, in the states of Baía and Minas Gerais. It is easily cultivated and has to be annual to have economical value. Showing a great rusticity, it thrives from the coasts to an altitude of 1.000 meters.

As to soil adaptation, it is more conformable than jute It grows in silici-argilous ground of a medium fertility. It is not fit for lands soaked with stagnant water, neither for the acid, or rich of organic matter. In the latter case the plant will suffer the formation of lateral boughs, which besides laying the plant, spoils the quality of the fiber.

This fiber is used in the manufacture of cord, ropes, baggings, etc. It is also used in the calking of ships. The seeds produce a siccative oil that can be used in paints and varnishes.

After the decortication, the stalks are used in the manufacture of cellulose.

MALVALISTRO

"Malvalistro" (marshmallow) a plant of the family Malvaceae, is scientifically classified **Sida micrantha** St. Hil. It is also commonly called "Malva", "Malvarisco", "Malvaisco", "Malvapreza" and "Guaxima" in the state of Minas Gerais. It grows up to 2 meters in height and even more. The fiper thereof is of good quality and it affords a high yieldg as its caulis are little branchy. The Ministry of Agriculture in Brazil started the cultivation of the "Malvalistro" in the year of 1934, at the Experimental Stations of Minas Gerais. For the moment it is not an object of industrial exploitation.

JUTA PAULISTA

"Juta Paulista" is a plant belonging to the family Malvaceae, whose scientific classification is : **Hibiscus kitaibelifolius..**

It has a rapid growth and reaches 2,50 to 3,70 meters, and it is very resistant to plagues and diseases.

The "Juta Paulista" is being cultivated at São Paulo and affords two prunings per year during five consecutive years.

The maceration of the fiber is generally done in tanks with still water. It is being advantageously employed in baggings. The bags of the export type (weighing 500 grams) are reported good and meet a good demand in the brazilian markets.

NEW ZEALAND FLAX

Reference is made here to a fiber extracted from the **Phormium tenax** Forts, of the family Liliaceae.

This plant is now being cultivated at Mogy das Cruzes in the

THE CULTIVATION OF "SIDA MICRANTHA" IN THE STATE OF MINAS GERAIS.

HEAPS OF "SIDA MICRANTHA" BEFORE DECORTICATION.

state of São Paulo, and is becoming largely interesting due to its facility of reproduction, rusticity and great yield of fibers.

Its percentage of fiber rates 18%, and the yield of the plant per hectare is 6 to 7 tons.

The fiber gives satisfactory results in the making of ropes, threads, cords, door mats and rugs. As compared with the indian Jute, it has the advantage of an easier, quicker and more economical decortication.

Its resistance to tension per millimeter is 38,296, while that of the jute is 35,750. As to torsion its mean industrial value is 6,96, and that of the jute 6,50.

As soon as the proper machinery for the decortication of the New Zealand flax is available, its industrialization will have a great development in the country

MACAMBIRA

"Macambira" is a bromeliaceous, scientifically classified as **Bromelia lacinissa** Mart., occurring on the "caroá" zones. Tho having an enormous spontaneous growth in Northeast Brazil, it is not industrialized as yet.

COQUEIRO DA BAÍA

Also called "coqueiro da praia" (Sea-shore coconut palm tree) is the scientific **Cocos nucifera** L. It belongs to the Palmaceae family, and exists in large aggregations along the coast of the country, from Baía to Ceará. It also appears in the islands of the Guanabara Bay and in small isolated groups in the inner lands of the Northeast. From the husk of the coconut, brushes, scrubbers and door mats are made. It is also used for oil filters and in the calking of ships. The shell or pericarp is used in the making of vases, buttons and other small articles.

ABACAXI — The well known pineaple, scientifically classified **Ananas sativus** and belonging to the family Bromeliaceae. It is cultivated in Brazil for its delicious fruit, specially in the states of Pernambuco, Rio de Janeiro and São Paulo. Its leaves supply an excellent fiber, which, however, up to the moment, has not been industrialized to a large extent.

GRAVATÁS

In the Brazilian Northeast there are various plants of the family Bromeliaceae, which are known by the generic name of "Gravatás". Outstanding among them we find the " gravatá da praia " (seashore gravatá) and "gravatá da mata" (midland gravatá). Both supply textile fibers that can be industrialized. The "piteira" (Furcroya gigantea) and the "sisal" (Agave sisaliana), tho not of a Brazilian origin, they can be successfully cultivated in this country, as s o m e plantations of these Amaryllidaceous are already to be found here in Brazil.

Brazil possesses a large number of "embiras" of the Anonaceae and Bombaceae families the libers of which produce fibers used for making ropes, cords, etc. Outstanding among them we find the **Xylopia frutescens** Aubl., **Xylopia emarginata** Mart, **Xylopia cericea** St. Hil. and the **Bombax Sp.**

"Barba de Velho" (Tillandsia usneoides) which is known in some other places as New Orleans Moss, grows in Brazil, and serves to fill cushions, mattresses, and saddles. It is also used in place of excelsior.

"Aninga" (Monticrardia linifera Schott) is a sort of arum, which is found at plains and marshy lands, the stems and roots of which produces a fiber that can be used in the textile, rope and paper industries. The species of **Desmoncus** existing in Brazil, specially the "Jacitara", (Desmoncus Macroacanthus) are used for weaving seats and backs of chairs as it can advantageously substitute the **Calamus rotang.**

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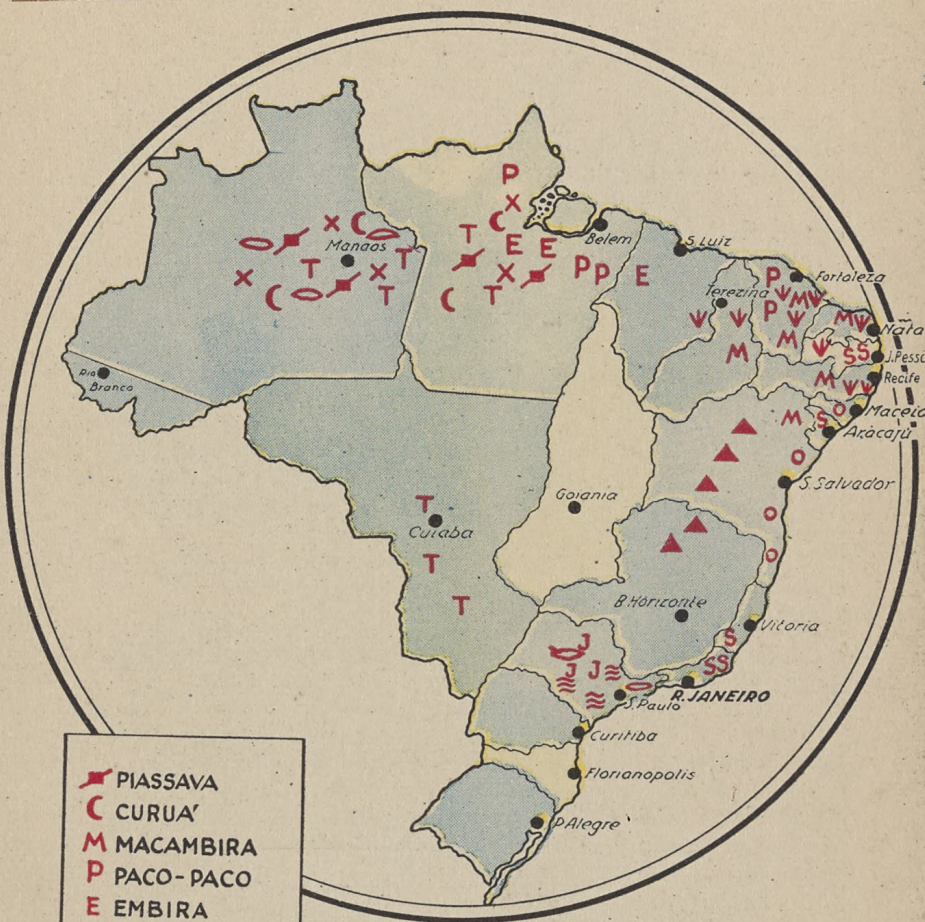


- PIASSAVA
- CURUA'
- MACAMBIRA
- PACO-PACO
- EMBIRA
- JUTE
- POPPY
- SISAL
- GRAVATA'
- N.ZEALAND FLAX
- TUCUM
- PITEIRA
- COCONUT
- ITUA'

OFFICIAL PUBLICATION

BRAZIL
BABASSU

BABASSÚ

FOREWORD

BABASSÚ IS A GENUINE BRAZILIAN PALM WHICH FORMS, IN VARIOUS STATES OF THE COUNTRY, PARTICULARLY IN MARANHÃO AND PIAUÍ, VAST, DENSE GROVES.

ITS HABITAT COVERS AN EXTENSIVE AREA, WHICH INCLUDES THE AMAZON AND MATO GROSSO, DOWN TO BOLIVIA.

IT ALSO OCCURS IN THE STATE OF MINAS GERAIS GROWING SIMULTANEOUSLY WITH THE MACAÚBA PALM (ACCROCOMIA SCLEROCARPA).

SCIENTIFIC CLASSIFICATION

ORBIGNIA SPECIOSA (BARBOSA RODRIGUES).

VEGETATION

IT IS IN THE STATE OF MARANHÃO THAT ONE FINDS THE LARGEST AREA COVERED WITH BABASSÚ PALMS, FORMING VERY LARGE GROVES WITH APPROXIMATELY 13 BILLION PALMS — AN EXTENSION OF SOME 8,655,400 HA. (21,387,493 ACRES). EACH PALM MAY YIELD AN AVERAGE OF 1,000 NUTS, WHICH MEANS A TOTAL OF 13 TRILLION NUTS. THE ANNUAL PRODUCTION CAPACITY OF THE STATE OF MARANHÃO IS ESTIMATED AT 195 MILLION TONS OF KERNELS. THE YEARLY BRAZILIAN PRODUCTION CAPACITY IS ESTIMATED AT 300 MILLION TONS OF KERNELS.

USE

PRACTICALLY ALL OF THE BABASSÚ IS USED. THE LEAVES ARE USED IN THE MANUFACTURE OF STRAW HATS, PURSES, MATS, SIEVES, AND BASKETS.

THE NUT IS BURNED GREEN TO SMOKE UP LATEX, AS IT PRODUCES A THICK SMOKE.

THE KERNEL HAS SEVERAL USES. A FIBER HAVING VARIOUS USES IS SCUTCHED FROM THE EPICARP. THE YELLOWISH FECULA EXTRACTED FROM THE MESOCARP IS A NUTRITIOUS MEAL FROM WHICH BEVERAGES SIMILAR TO CHOCOLATE, AND MUSHES FOR CHILDREN AND CONVALESCENTS, ARE MADE. THE ENDOCARP, WHICH REPRESENTS 75% OF THE NUT, CAN BE USED AS A SUBSTITUTE FOR VEGETABLE IVORY WHERE THIS IS USED IN PLACE OF BONE, FOR MAKING SMALL ARTICLES, SUCH AS BUTTONS, INSULATORS, ETC.

TESTS MADE IN THE UNITED STATES SHOWED THAT THE ABSORBENT SUBSTANCE (FULLER) CAN BE USED IN THE COMPOSITION OF DYNAMITES. THE MESOCARP IS ALSO USED AS INSULATING MATERIAL.

FROM THE SHELL THE FOLLOWING PRODUCTS CAN BE OBTAINED : CALCIUM ACETATE, METHYL ALCOHOL, ACETIC ACID, VINEGAR FROM PYROLIGNOUS ACID, LIGHT AND HEAVY LUBRICATING OILS, DYES, CARBOLIC ACID, CREOSOL, IRON INKS, TARS, ROSINS, AND A HIGH-QUALITY FUEL.

THE OIL IS USED BOTH AS A LUBRICANT AND AS A FUEL; IN THE PERFUME INDUSTRY, IT IS USED IN THE MANUFACTURE OF QUALITY SOAPS; IN COOKING, IT SUBSTITUTES LARD AND OLIVE OIL. THE BUTTER MADE FROM BABASSÚ OIL, AS GOOD AND NUTRITIOUS AS THAT MADE FROM MILK, IS ALREADY UNIVERSALLY USED.

THE STALKS OF THE PALMS ARE USED AS STAYS OR PROPS.

ANALYSIS

THE BABASSÚ NUT IS COMPOSED OF THE FOLLOWING PARTS :

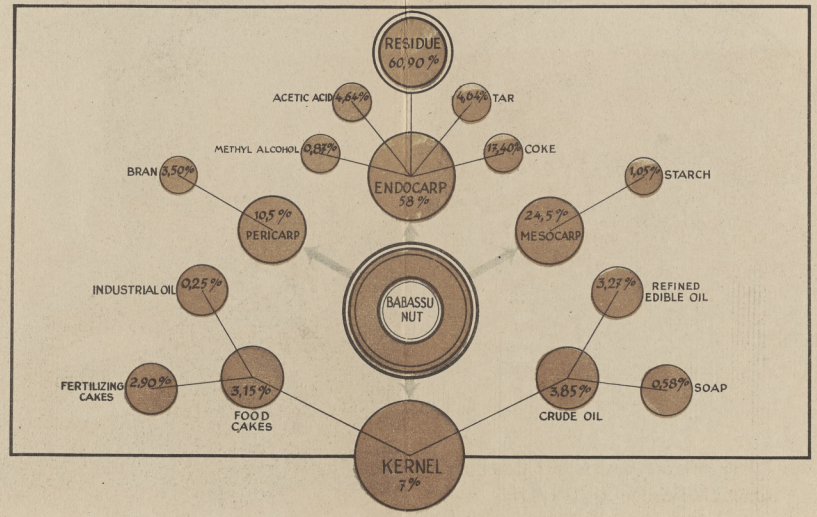
EPICARP	11%
MESOCARP	23%
ENDOCARP	57%
KERNEL	9%

THE **EPICARP** IS COMPOSED OF RESISTANT FIBERS, THAT COVER THE MESOCARP.

THE **MESOCARP** IS COMPOSED OF A COMPACT, PULPY SUBSTANCE, VIOLACEOUS WHITE WITH A HIGH PERCENTAGE OF STARCH AND TANNIC ACID.

BABASSÚ PALM TREE

BABASSÚ PRODUCTS AND BY-PRODUCTS



THE **ENDOCARP** IS THE ENCLOSURE OF THE KERNEL. IT IS A COMPACT TISSUE OF LIGNEOUS CELLS. IT CAN BE USED IN THE MAKING OF BUTTONS, ETC. IT CONTAINS HYDROCHLORIC ACID, SILICA, IRON PHOSPHORUS, MAGNESIUM, AND ALKALINE METALS.

THE **SEED** IS ACTUALLY THE KERNEL WHICH YIELDS AN OIL OF A HIGH INDUSTRIAL VALUE, THE ANALYSIS OF WHICH READS AS FOLLOWS :

DENSITY AT 15 DEGREE C.	.9218
MELTING POINT	23.2 C
ACIDITY INDEX	12.8
SAPONIFICATION INDEX	250.2
ETHER VALUE	237.4
ESTIMATED GLYCERINE	12.82
IODINE VALUE	14.11

CLUSTERS OF BABASSÚ

THE CAKE — AFTER THE EXTRACTION OF THE OIL FROM THE KERNEL, THE RESIDUE, WHICH STILL CONTAINS A CERTAIN AMOUNT OF OIL, IS PRESSED INTO CAKES, USED AS CATTLE FEED, ENJOYING A GREAT DEMAND IN FOREIGN MARKETS.

THE **EPICARP**, THE **MESOCARP** AND THE **ENDOCARP** CAN BE ACTUALLY USED AS FUEL, FOR VARIOUS TESTS HAVE BEEN MADE WITH POSITIVE, ENCOURAGING RESULTS.

A METHODICAL STUDY CONCERNING THE TREATMENT OF BABASSÚ COKE GAVE THE FOLLOWING RESULTS :

30% METALLURGICAL COKE
60% ACETIC ACID
1.5% METHYL ALCOHOL
8% TAR

THE COKE ANALYZED IN THE LABORATORY OF THE "ÉCOLE DES ARTS ET MÉTIERS" IN FRANCE, GAVE THE FOLLOWING RESULTS :

90% PURE CARBON
5.4% VOLATILE MATTER
4.4% ASHES
0.85% TOTAL HUMIDITY

AS A DRY FUEL IT GIVES 7.700 CALORIES. IT IS CONSIDERED A MOST EXCELLENT FUEL BECAUSE IT DOES NOT CONTAIN SULPHUR OR ARSENIC AND HAS BUT A VERY SMALL PERCENTAGE OF PHOSPHORUS.

INDUSTRY

THE BABASSÚ OIL INDUSTRY IN BRAZIL IS STILL IN ITS PRIMARY STAGE, IN SPITE OF THE EXISTENCE OF A FEW MILLS, ESPECIALLY IN THE STATE OF MARANHÃO.

THE UNITED STATES AND EUROPE GIVE A PREFERENCE TO BABASSÚ NUTS YIELDING FROM 65% TO 66% OIL.

EXPORTS

FOLLOWING IS A LIST SHOWING EXPORTS OF BABASSÚ NUTS, DURING A PERIOD OF FIVE YEARS.

YEAR	TONS	DOLLARS PAPER	AVERAGE VALUE PER TON
1933	613	$ 28,499.	$ 46.
1934	214	$ 15,234.	$ 70.
1935	9,809	$ 769,433.	$ 77.
1936	30,276	$3,365,333.	$109.
1937	21,777	$2,467,538.	$112.

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REGIONS WHERE BABASSÚ CAN BE SUCCESSFULLY CULTIVATED

SEYMOUR DURST

OFFICIAL PUBLICATION

URSULA FAMBLE

BRAZIL

ALUMINIUM

ALUMINIUM

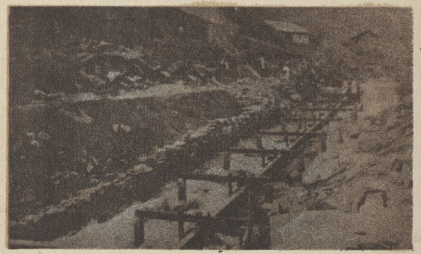
BAUXITE IS THE PRINCIPAL ALUMINIUM ORE AND **VERY RICH DEPOSITS OF BAUXITE ARE KNOWN IN THE BRAZILIAN TERRITORY.**

THE MOST MODERN PROCESSES OF ALUMINIUM PREPARATION HAVE PROVED THE SUPERIORITY OF BAUXITE AS COMPARED WITH OTHER ALUMINIUM ORES, SPECIALLY BECAUSE THE ALUMINIUM PRODUCTION THEREOF IS 30 TO 50% CHEAPER THAN THAT FROM OTHER ORES. THE BEST KNOWN AND MOST STUDIED DEPOSITS OF BAUXITE IN BRAZIL ARE THOSE IN THE STATE OF MINAS GERAIS, AT POÇOS DE CALDAS AND OURO PRETO, THOSE ON THE BORDER OF PARÁ AND MARANHÃO, AND THOSE AT MUQUÍ IN THE STATE OF ESPIRITO SANTO. LIKEWISE INTERESTING ARE THE BAUXITE DEPOSITS EXISTING IN BAÍA, AT CORRENTINAS AND BARRA DO MENDES; THOSE OCCURRING IN THE STATE OF RIO DE JANEIRO, AT ENTRONCAMENTO, AND STILL OTHERS IN THE STATE OF MINAS GERAIS, AT MOTUCA AND LAGÔA DOURADA.

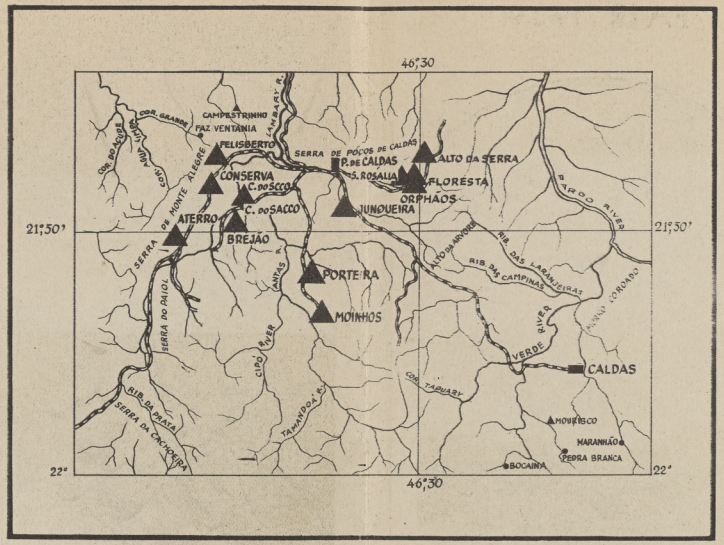
WORLD'S CONSUMPTION OF BAUXITE HAS INCREASED CONSIDERABLY DURING THE LAST FEW YEARS, DUE TO THE VARIOUS USES OF THE MINERAL, IN METALLURGY, CHEMISTRY, SPECIALLY IN THE PRODUCTION OF SULPHATE OF ALUMINA, REFRACTORY PRODUCTS, ABRASIVES, ALUMINOUS CEMENTS, FILTERS FOR THE CLARIFICATION OF PETROLEUM DERIVATIVES AND SEVERAL OTHER USES.

THE PRINCIPAL BAUXITE DEPOSITS ARE SITUATED ON THE BORDER OF PARÁ AND MARANHÃO, AT TRAÍRA, PIRACANA, ITACUPIM, SERRA DO PIRIÁ AND TROMAÍ THE DSPOSITS OF TRAÍRA WERE ESTIMATED AT 10 MILLION TONS THE ORES THEREOF ARE OF A PHOSPHORIC BASIS, AND ATTEMPTS ARE BEING MADE TO DEVELOP SAME INTO CHEMICAL FERTILISER.

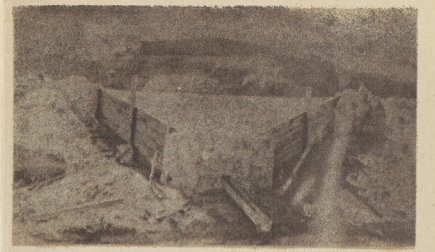
THE CENTRAL PLATEAU OF POCOS DE CALDAS, IN THE STATES OF SAO PAULO AND MINAS GERAIS, COVERED WITH BAUXITE ALUMINIUM ORE.



ALUMINIUM ORE DEPOSIT AT THE ENTRANCE OF THE WASHER, IN THE STATE OF ESPIRITO SANTO.



PRINCIPAL OUTCROPS OF ALUMINIUM ORES AND BAUXITE AT THE CENTRAL PLATEAU OF POÇOS DE CALDAS ON THE BOUNDARIES OF MINAS GERAIS AND SÃO PAULO.



ALUMINIUM ORE WASHER IN A RIVER AT FLOOD IN THE STATE OF ESPIRITO SANTO.

HEAPES OF ALUMINIUM ORES IN THE PROXIMITY OF THE MINE, IN THE STATE OF ESPIRITO SANTO.

THE DEPOSITS OF MUQUÍ, IN THE STATE OF ESPIRITO SANTO, WERE ESTIMATED AT 400 THOUSAND TONS. THOSE OF MUTUCA IN THE STATE OF MINAS GERAIS WERE ESTIMATED AT THREE MILLION TONS; THE ONES AT OURO PRETO, LYING AT LAGÔA DO GAMBÁ AND MORRO DO CRUZEIRO, HAVE BEEN ESTIMATED AT TWO MILLION TONS.

THE FLOURISHING INDUSTRY OF **SUPHATE OF ALUMINA** ALREADY ESTABLISHED AT SÃO PAULO, IS SUCCESSFULLY EMPLOYING THE BAUXITE FROM THE DEPOSITS OF OURO PRETO.

THE BAUXITE DEPOSITS ON THE PLATEAU OF POÇOS DE CALDAS, WHICH ARE VERY RICH, CAN ALWAYS BE WORKED AT OPEN SKY. MUCH OF THE BAUXITE PRODUCED IN THESE DEPOSITS IS CONSIDERED TO BE THE BEST IN THE WORLD, WITH A YIELD OF 80% ALUMINIUM AND ONLY 18% OF WATER. THE PRINCIPAL DEPOSITS KNOWN HERE BELONG TO SR. LINDOLPHO PIO DA SILVA DIAS, AND TO THE "COMPANHIA GERAL DE MINAS". THE LATTER HAS A COMPLETE INSTALLATION WITH AN OUTPUT OF 200 TONS PER DAY, WITH IMPROVED METHODS OF PROCESSING AND MAKING READY FOR SHIPMENT A MATERIAL WITH NO SIMILAR IN THE WORLD. LARGE SHIPMENTS OF BAUXITE HAVE ALREADY BEEN MADE TO THE ARGENTINE REPUBLIC. IN 1936, 15.000 TONS WERE EXPORTED TO THAT COUNTRY AND IN 1937 THE EXPORTS THERETO REACHED OVER 50.000 TONS. THEY ARE USING THE ORE IN THE MANUFACTURE OF SULPHATE OF ALUMINA FOR TREATING THE WATERS OF THE "PLATA" RIVER WHICH CALL FOR A SUPPLY OF APPROXIMATELY 52.000 TONS.

THE DEPOSITS OF BAUXITE ALREADY KNOWN IN BRAZIL CAN BE ESTIMATED TO EXCEED 20 MILLION TONS. THE DEPOSITS OF POÇOS DE CALDAS ALONE, FOR ITS CAPACITY, QUALITY OF ORES AND THE EASE OF BEING DIGGED IN THE OPEN, SHOULD BE RANKED AMONGST THE BAUXITE DEPOSITS OF PREMIER IMPORTANCE IN THE WORLD.

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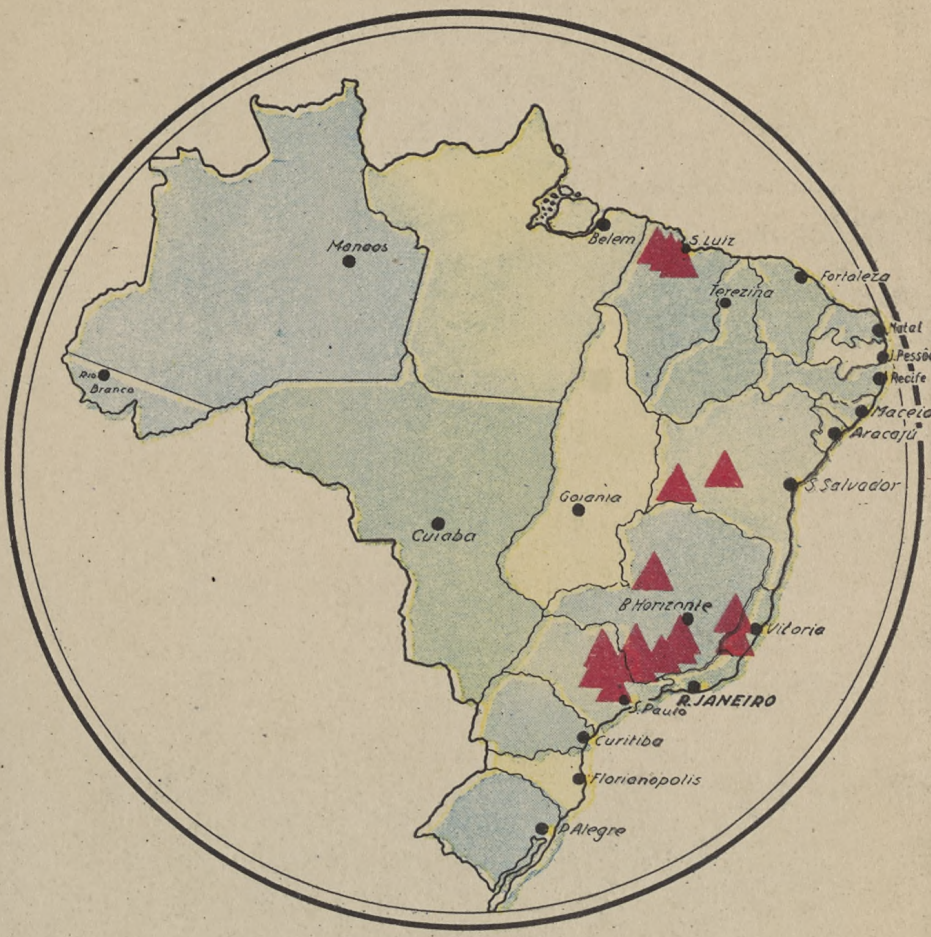


PRINCIPAL BEDS AND OCCURRENCES OF ALUMINIUM ORES IN BRAZIL

SEYMOUR DURST

OFFICIAL PUBLICATION

BRAZIL

WATER POWER

WATER POWER IN BRAZIL

THE GREATEST HYDROGRAPHIC SYSTEMS OF THE WORLD ARE FOUND IN BRAZIL : THE AMAZON, THE PARAGUAI RIVER AND THE PARANÁ RIVER BESIDES THESE, THE SYSTEMS OF THE SÃO FRANCISCO, DOCE, AND PARAÍBA RIVERS ARE VERY IMPORTANT.

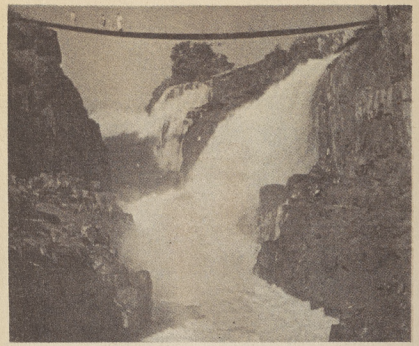
FURTHERMORE, THE SURFACE OF THE BRAZILIAN GROUND SHOWS STEEP CHAINS NEIGHBORED BY SLIGHTLY ONDULATED ZONES OR EXTENSIVE PLAINS, FORMING A SPECIAL ORO-HYDROGRAPHIC COMPLEX WHICH MAKES BRAZIL THE RICHEST COUNTRY IN THE WORLD AS FAR AS HYDRAULIC POWER IS CONCERNED.

DURING THE LAST FEW YEARS, THE CREATION OF THE HYDRAULIC POWER SERVICE HELPED THE TECHNICAL STUDY OF THE HYDRAULIC POTENTIAL OF THIS COUNTRY, TO-DAY KNOWN TO A CERTAIN PRECISION, AND RECKONED TO REACH ABOUT 16 MILLION HORSEPOWER.

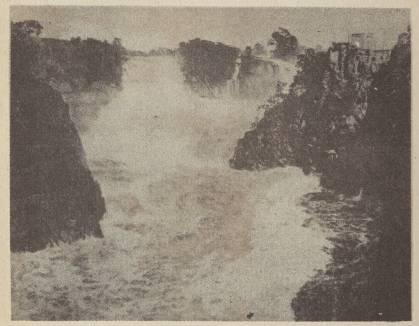
IF WE CONSIDER BRAZIL AS DIVIDED INTO EIGHT GREAT HYDROGRAPHIC SYSTEMS, AMAZON, NORTHEAST, S. FRANCISCO, EAST, PARAGUAI, PARANÁ, URUGUAI AND SOUTHEAST, WE FIND THAT ONLY IN THE EASTERN AND SOUTHEASTERN SYSTEMS, A FAINT INDUSTRIAL DEVELOPMENT OF THE WATERFALLS HAS TAKEN PLACE.

THE GREAT, WORLD KNOWN, BRAZILIAN WATERFALLS, "ITAPARICA" AND "PAULO AFONSO" ON THE SÃO FRANCISCO RIVER, "SETE QUEDAS" OR "GUAIRA" AND "IGUASSÚ" ON THE PARANÁ RIVER, AND OTHERS, REMAIN PRACTICALLY INDUSTRIALLY UNEXPLORED. A LIST OF WATERFALLS IN BRAZIL WOULD SHOW OVER A THOUSAND RATHER APPRECIABLE FALLS, AS FOLLOWS : 342 IN THE PARANÁ SYSTEM, 256 IN THE AMAZON, 91 IN THE SÃO FRANCISCO SYSTEM, 72 IN THE SOUTHEASTERN SYSTEM, 40 IN THE URUGUAI SYSTEM, 32 IN THE NORTHEASTERN SYSTEM AND 24 IN THE PARAGUAI SYSTEM.

IN THE PARANÁ RIVER SYSTEM THE FOLLOWING FALLS ARE NOTEWORTHY : "SALTO DAS SETE QUEDAS" (OR



THE "GUAIRA" RAPIDS, "SETE QUEDAS" FALLS



"PAULO AFONSO" WATER FALLS

BRAZIL

DEVELOPMENT OF ELECTRICAL INDVSTRY IN BRAZIL

- FIRST THERMO-ELECTRIC PLANT IN BRAZIL
- FIRST HYDRO-ELECTRIC PLANT IN BRAZIL
- EXPANSION OF ELECTRICITY IN BRAZIL
- CAPITAL OF THE STATE

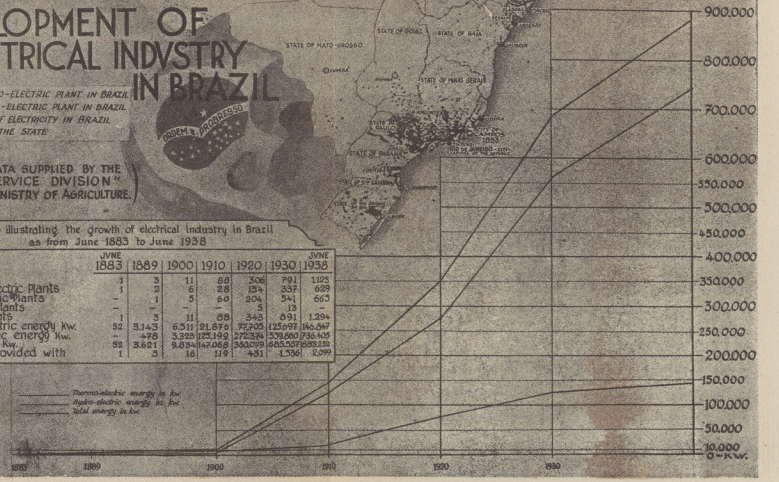
(OFFICIAL DATA SUPPLIED BY THE "WATER SERVICE DIVISION" OF THE MINISTRY OF AGRICULTURE.)

ORDEM E PROGRESSO

STATE OF AMAZONAS
STATE OF PARA
STATE OF MATO-GROSSO
STATE OF GOYAZ
STATE OF BAIA
STATE OF MINAS GERAES
STATE OF PARANA
STATE OF S. PAULO
STATE OF RIO DE JANEIRO
FEDERAL DISTRICT

Map illustrating the growth of electrical industry in Brazil as from June 1883 to June 1938

	JVNE 1883	1889	1900	1910	1920	1930	JVNE 1938
Companies	1	3	11	68	306	791	1125
Thermo-electric Plants	1	2	6	28	134	337	629
Hydro-electric Plants	–	1	5	40	204	541	665
Combined Plants	–	–	–	–	4	13	–
Total of Plants	1	3	11	68	343	891	1.294
Thermo-electric energy Kw.	52	3.143	6.311	21.876	77.705	125.697	146.947
Hydro-electric energy Kw.	–	475	3.322	125.192	272.324	579.860	736.405
Total energy Kw.	52	3.621	9.634	147.068	380.029	665.557	883.252
Localities provided with	1	3	16	119	431	1.536	2.099



"MARIBONDO" WATER FALLS

"IGUASSU" FALLS AND THE "FLORIANO" RAPIDS

"GUAIRA") WITH A MINIMUM POTENTIAL OF 5.000.000 H. P. "SALTO DE URUBÚPUNGÁ" (447.000 H. P.); "SALTO SANTA MARIA" (OR "IGUASSÚ") (337.000 H. P.) "SALTO OZORIO" (70.000 H. P.), ALL ON THE PARANÁ RIVER; "SALTO GRANDE" ON THE PARANAPANEMA RIVER (20.000 H. P.); "SALTO ITAPÚRA" (155.000 H. P.), AND "AVANHANDAVA" (62.000 H. P.), BOTH ON THE TIETÉ RIVER; "SALTO DA ONÇA" (800.000 H. P.), "AGUA VERMELHA" (100.000 H. P.) AND "MARIBONDO" (200.000 H. P.) ALL ON THE RIO GRANDE; FINALLY, THE "CACHOEIRA DOURADA" (200.000 H. P.), ON THE PARANAÍBA RIVER.

IN THE EASTERN SYSTEM MAY BE MENTIONED THE FOLLOWING FALLS : "PAREDÃO" AND "FUNIL" (40.000 H. P.); "SAPUCAIA" (76.000 H. P.); "MAMBUCABA" (82.000 H. P.); "BRACUÍ" (15.000 H. P.) AND "ARIRÓ" (5.000 H. P.).

THE FOLLOWING FALLS ARE ALSO IMPORTANT : "SALTO GRANDE" (80.000 H. P.), ON THE JEQUITINHONHA RIVER AND "CACHOEIRA DA PANCADA" (14.000 H. P.) ON THE RIO DE CONTAS.

IN THE SÃO FRANCISCO SYSTEM WE HAVE THE "CACHOEIRA DE PAULO AFONSO" AND "ITAPARICA" FALLS; IN THE URUGUAI SYSTEM, "SALTO DO ESTREITO" (47.000 H. P.) AND "SALTO GRANDE" (40.000 H. P.).

IN THE SOUTHEASTERN SYSTEM WE MAY NOTE THE "SALTO DA ANTA" (50.000 H. P.); THE "SALTO DO INFERNO" (20.000 H. P.), AND "ITAPANHAÚ" FALLS (80.000 H. P.).

IN THE AMAZON WE HAVE "CACHOEIRA DO UTIARITÍ" (80.000 H. P.) AND "SALTO BELO" (40.000 H. P.), BOTH IN THE STATE OF MATO GROSSO, ON TRIBUTARIES OF THE TAPAJÓS RIVER.

THE REMAINING HYDROGRAPHIC SYSTEMS OF THE COUNTRY HAVE A GREAT NUMBER OF LESS IMPORTANT RAPIDS AND FALLS.

THE INDUSTRIAL EXPLORATION OF HYDRO-ELECTRIC ENERGY IN BRAZIL, STARDED 50 YEARS AGO. THE FIRST PLANT WAS PUT IN JUIZ DE FÓRA (STATE OF MINAS GERAIS) IN 1889, AND THENCEFORWARD, PLANTS HAVE BEEN REGULARLY PUT UP AS SHOWN BY THE GRAPH ACCOMPANYING THE MAP THAT ILLUSTRATES THIS EXPOSITION.

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BRAZILIAN RIVERS — SOME OF THE PRINCIPAL WATER-FALLS

Porteira	in the	Trombetas
Inferno	" "	Erepicurú
Itaboca	" "	Tocantins
3 Ilhas	" "	Tapajoz
Iriry	" "	Xingú
Mangabal	" "	Tapajoz
Uchôa	" "	Mearim
Urubú	" "	Parnaíba
Paulo Afonso	in the	São Francisco
Itaparica	" "	" "
Salto Grande	" "	Jequitinhonha
Gameleira	" "	Paraguassú
Itapemirim	in the	Itapemirim
Maribondo	" "	Rio Grande
Urubupungá	" "	Paraná
Itapura	" "	Tieté
Sete Quédas	" "	Paraná
Iguassú	" "	Iguassú
Salto Grande	" "	Peperiguassú
Salto Oriental	" "	Quaraím
Casca da Anta	" "	São Francisco
Dourada	" "	Parnaíba
Fumaça	" "	Rio do Sono

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